CLAIMS

1. A method of measuring a temporal profile of an optical pulse, comprising the steps of:

resolving a single optical pulse according to both time and optical wavelength;

recording a plurality of optical intensity values produced by at least said single optical pulse and resolved in both time and optical wavelength;

correcting said recorded values to reduce a dependence thereof upon optical wavelength; and

combining said corrected values over said optical wavelength to produce combined corrected values that vary with time but not optical wavelength.

2. The method of claim 1, wherein said correcting step includes comparing a temporal dependence between at least two sets of said recorded data differing by optical wavelength.

3. The method of claim 2, wherein said comparing includes calculating a cross-correlation function between said two sets.

4. The method of claim 1, wherein said recording includes passing said optical pulse through a spectrograph coupled to an input of a streak camera.

5. A method of measuring dispersion in an optical fiber, comprising the steps of:

propagating an optical pulse on an optical fiber;

detecting said optical pulse output by said optical fiber and resolving it according to both time and optical wavelength;

recording a plurality of optical intensity values produced by at least said optical

pulse and resolved in both time and optical wavelength;

determining from said values a value of chromatic dispersion and a value of temporal dispersion of said optical pulse.

6. The method of claim 5, further comprising using said determined chromatic dispersion to produce a temporal profile of said pulse with reduced dependence upon wavelength.

7. A method of characterizing an optical fiber, comprising the steps of:

(a) irradiating one end of a first optical fiber of a first length with an optical pulse;

(b) wavelength dispersing an optical signal produced by said optical pulse after traversing said optical fiber;

(c) recording temporal profiles for a plurality of wavelength components of said wavelength dispersed optical signal;

(d) repeating steps (a), (b), and (c) for a second optical fiber of a second length substantially longer than said first length;

(e) comparing said temporal profiles recorded from said first fiber to said temporal profiles recorded from said second fiber to determine a dispersion of said second fiber.

8. The method of claim 7, wherein said second fiber is a multi-mode fiber and said comparing step determines at least an inter-modal dispersion of said second fiber.

9. The method of claim 7, wherein said comparing step determines a chromatic dispersion of said second fiber.

10. The method of claim 7, wherein said first length is less than 10m and said second length is greater than 1km.

11. A method of characterizing an optical fiber, comprising the steps of:
irradiating one end of an optical fiber with an optical pulse;
wavelength dispersing an optical signal emitted at a second end of said optical fiber and produced by said optical pulse while traversing said optical fiber;
recording temporal profiles for a plurality of wavelength components of said wavelength dispersed optical signal;
comparing said plurality of temporal profiles to determine time offsets between said temporal profiles; and
correcting said temporal profiles according to said offsets.

12. The method of claim 11, further comprising the step of combining said corrected temporal profiles to produce a combined corrected temporal profile with reduced dependence upon said wavelength.

13. The method of claim 11, further comprising Fourier transforming said combined corrected temporal profile.

14. The method of claim 13, further comprising comparing said Fourier transformed combined corrected temporal profile to a Fourier transformed temporal response obtained for a reference optical fiber.

15. The method of claim 11, wherein said comparing step includes calculating cross-correlation functions between a reference one of said temporal profiles and others of said temporal profiles.

16. The method of claim 11, wherein said irradiating, wavelength dispersing, and recording steps are repeated for a plurality of said optical pulses to produce said temporal profiles.

17. An optical measurement apparatus, comprising:

a wavelength-dispersing element receiving an optical signal and spatially spreading it in a first direction according to optical wavelength;

a streak camera receiving said optical signal spread along and first direction and recording a temporal dependence of said spread optical signal resolved in time and optical wavelength; and

calculating means responsive said data recorded by said streak camera for separating a chromatic dependence of said data from a temporal dependence of said data.

18. The apparatus of claim 17, wherein said wavelength-dispersing element is an imaging spectrograph.

19. The apparatus of claim 17, wherein said calculating means reduces a dependence of said data upon optical wavelength.

20. The apparatus of claim 17, wherein said calculating means adjusts a time dependence of said data according to the optical wavelength of said data.

21. The apparatus of claim 17, wherein said calculating means combines said adjusted data across values of optical wavelength of said adjusted data.

22. The apparatus of claim 17, wherein said calculating means compares data obtained from a first optical fiber inputting said optical signal to said spectrograph to

data obtained from a second optical fiber inputting said optical signal to said spectrograph to determine at least one dispersion of said first optical fiber.

23. The apparatus of claim 22, wherein said at least one dispersion includes both a chromatic dispersion and a temporal dispersion.